

01/16/14 Agenda

- Timeline for Chapter 5 - Part II
- Section 5.4 - Point Slope Form of a linear equation
- Homework - Worksheet 5.4

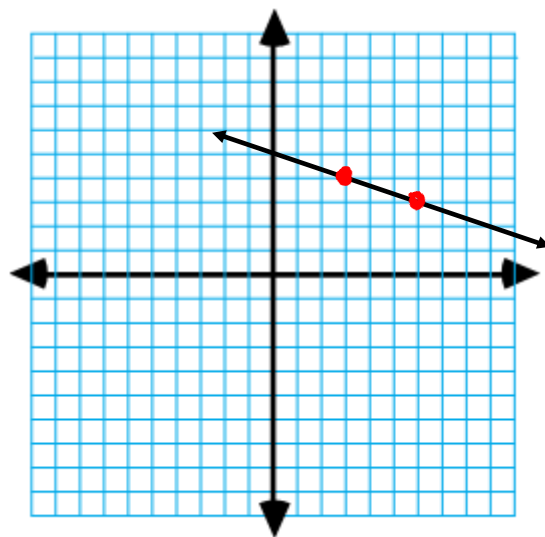
Warm Up

Which one of these equations is represented by the graph?

$$y - 3 = -\frac{1}{3}(x - 6)$$

$$x + 3y = 15$$

$$y = -\frac{1}{3}x + 5$$



Warm Up

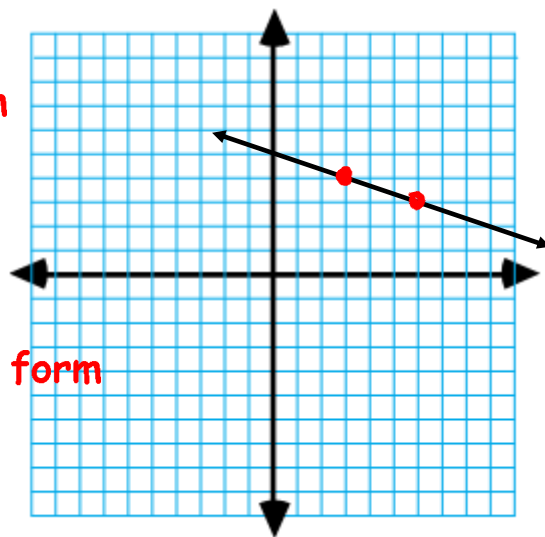
Which one of these equations is represented by the graph?

Actually, all 3 equations are represented by this graph

$$y - 3 = -\frac{1}{3}(x - 6) \quad \text{Point-Slope form}$$

$$x + 3y = 15 \quad \text{Standard form}$$

$$y = -\frac{1}{3}x + 5 \quad \text{Slope-Intercept form}$$



5.4 - Point-Slope Form of a Linear Equation

Target 5E

Forms of a Linear Equation:

Slope-Intercept Form: $y = mx + b$

Point-Slope Form: $(y - y_1) = m(x - x_1)$

Standard Form: $Ax + By = C$

Review: Write the following in Slope-Intercept Form:

$$m = 5 \quad b = -2$$

slope is -3, y-intercept is 8

$$y = 5x - 2$$

$$y = -3x + 8$$

Slope-Intercept form is: $y = mx + b$

where m is SLOPE and b is Y-INTERCEPT

Slope-Intercept Form is great when we are given **slope** and an **intercept**. If we are given a **point** and a **slope**, we want to use the **POINT-SLOPE FORM (PSF)** of the equation.

Point-Slope Form is: $(y - y_1) = m(x - x_1)$

where: $m = \text{slope}$

(x_1, y_1) is any point on the line

Writing in
PSF

Let's give it a try:

Write in point-slope form the equation of the line that passes through the given point and slope:

$$(y - y_1) = m(x - x_1)$$

slope = -3; $(4, -1)$ $(y - -1) = -3(x - 4)$

$$y + 1 = -3(x - 4)$$

$m = \frac{4}{5}$; $(-2, 7)$ $(y - 7) = \frac{4}{5}(x - (-2))$

$$y - 7 = \frac{4}{5}(x + 2)$$

$m = -8$; $(0, 8)$ $(y - y_1) = m(x - x_1)$

$$(y - 8) = -8(x - 0)$$

$$y - 8 = -8x$$

5.4 - Point-Slope Form of a Linear Equation

Target 5E

Writing
given 2
points:

If you are given two points, FIND the slope, CHOOSE one of the POINTS (it doesn't matter which one), then write the equation using the **point** and **slope**.

$$\begin{array}{c} x_1, y_1 \\ (1, 4) \end{array} \text{ and } \begin{array}{c} x_2, y_2 \\ (2, 7) \end{array} \quad \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 4}{2 - 1} = \frac{3}{1} = 3$$

$$y - 7 = 3(x - 2)$$

$$y - 4 = 3(x - 1)$$

$$\begin{array}{c} x_1, y_1 \\ (2, 0) \end{array} \text{ and } \begin{array}{c} x_2, y_2 \\ (3, -2) \end{array} \quad \frac{-2 - 0}{3 - 2} = \frac{-2}{1} = -2$$

$$\begin{array}{l} y - 0 = -2(x - 2) \\ y = -2(x - 2) \end{array}$$

$$y - (-2) = -2(x - 3)$$

$$y + 2 = -2(x - 3)$$

(2, 3) and (4, 7)

$$x_1 = 3$$

$$y_1 = -2$$

$$(y - y_1) = m(x - x_1)$$

5.4 - Point-Slope Form of a Linear Equation

Target 5E

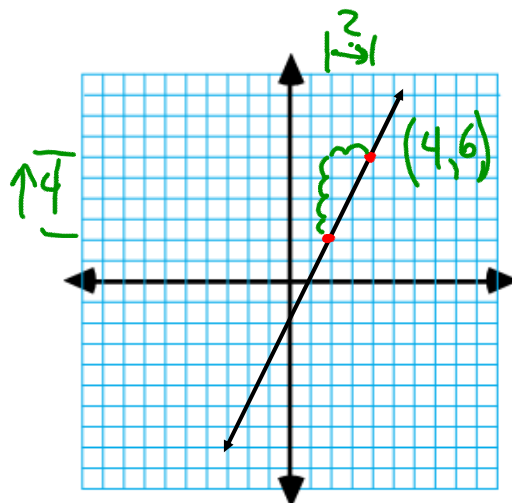
Writing
from a
graph:

Here's the trick, FIND the slope from the graph, then use a point from the graph:

$$m = \frac{4}{2} = 2$$

$$(4, 6)$$

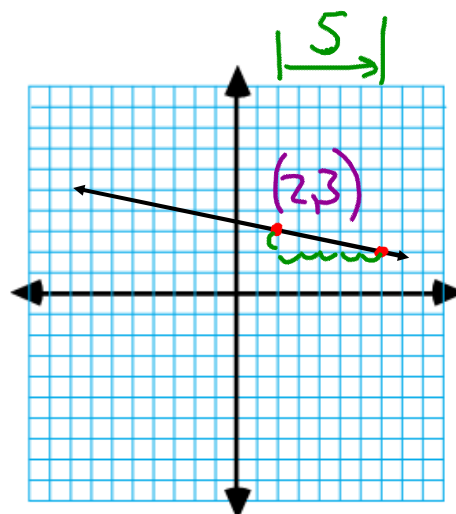
$$y - 6 = 2(x - 4)$$



$$m = -\frac{1}{5}$$

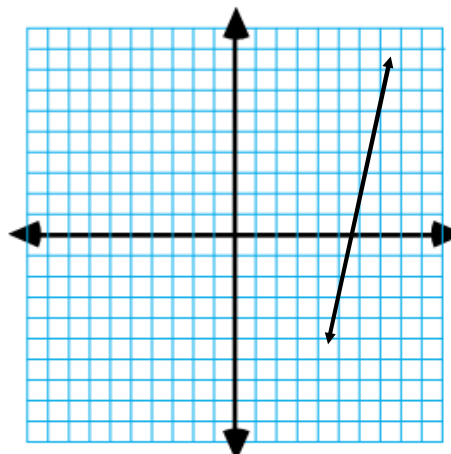
$$(2, 3)$$

$$y - 3 = -\frac{1}{5}(x - 2)$$



$$m =$$

$$(\quad , \quad)$$



5.4 - Point-Slope Form of a Linear Equation

Target 5E

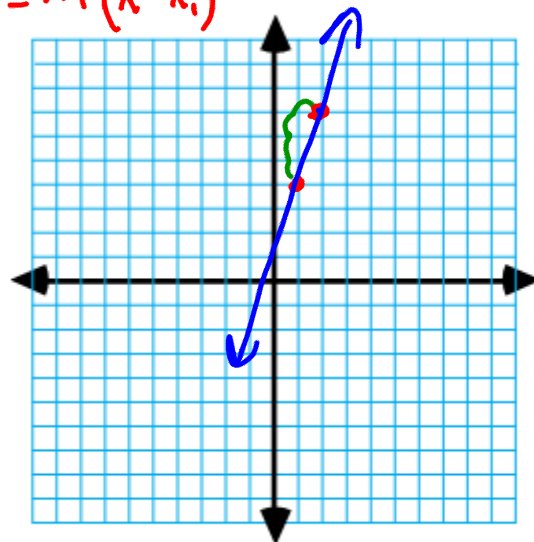
Graphing
PSF:

$$(y - y_1) = m(x - x_1)$$

$$y - \underline{4} = 3(x - \underline{1})$$

$$m = \underline{3} = \frac{\underline{3}}{\underline{1}}$$

$$(\underline{1}, \underline{4})$$



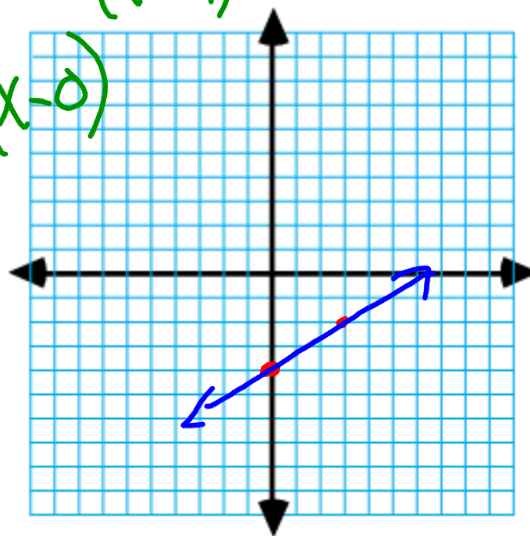
$$(y - y_1) = m(x - x_1)$$

$$y + 4 = \frac{2}{3}x$$

$$y - (-4) = \frac{2}{3}(x - 0)$$

$$m = \frac{2}{3}$$


$$(0, -4)$$



5.4 - Point-Slope Form of a Linear Equation

Target 5E

Rearranging into Slope-Intercept Form:

$$y - 4 = 3(x - 1)$$

$$y - 4 = 3x - 3$$

(Handwritten red +4 under the -4 and the -3)

$$y = 3x + 1$$

$$y - 4 = -\frac{1}{2}(x + 1)$$